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A format considering factors to be studied in a proposed obsolescence formula. Items listed under the physical characteristics category are intended to be subjected to a technical evaluation under which the condition and adequacy of the building and building system may be subsequently measured as a yardstick of the building's present and future use as an academic facility. Other categories given consideration include building services, codes, and safety, building location, and land use. Items listed under an academic category involve evaluation to be based on current academic use and conducted on a room-by-room basis. A point system is presented for evaluation of the items listed under each category. Projections of the rate of obsolescence based on point system time relationships are presented in graphic form. (FS)

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PROPOSED FACILITY QUALITY STUDY FORMAT

Obsolescence Formula Study Factors - Description

Technical and Operational

1. Physical Characteristics. It is intended that items listed under this category be subjected to a technical evaluation under which the condition and adequacy of the building and building systems may be subsequently measured as a yardstick of the buildings' present and future use as an academic facility. In general, this represents a critical appraisal of space, light, heat and energy as represented by the following detailed considerations:

   A. Structural Condition. Identification of any deterioration in structural systems since the building was constructed; in particular the cumulative effects of climate, soil compaction, building loading. fatigue, displacement and component failure of beams, columns, girders, joists, footings, walls, floors and such other elements as may be integral to concrete, steel, wood or masonry structural systems.

   B. Exterior Condition. Evaluation of building facing materials, walls, windows, doors, insulation, calking, flashing, roofing, painting, dampproofing and weatherproofing.

   C. Interior Condition. Surface materials (partitions, ceilings, walls, floors) finishes, building components (doors, windows), acoustical qualities, natural light, effects of previous remodeling or modifications; condition of fixed equipment such as millwork, shelving, and storage cabinets.

   D. Building Efficiency. A measure of actual building efficiency arrived at by comparing gross area, assignable area and assignable/gross ratio with the norm for building type.

   E. Adaptability to Expansion. Interior planning and space distribution, horizontal and vertical access, exits, building configuration and other architectural considerations. Flexibility of heating, ventilating, cooling and plumbing installations, transformers, switchgear and secondary electrical distribution systems.

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F. Mechanical Building Systems. Adequacy, suitability and efficiency of heating, ventilating and air conditioning installation. Condition of plumbing including fixtures, waste lines, traps, vents and related piping. Capacity and efficiency of vertical transportation.

G. Electrical Building Systems. Lighting, light levels, fixtures, switching and convenience outlets, power supply (qualitative and quantitative) building (secondary) electrical distribution, transformer, switchgear, building service and emergency power supply.

H. Special Systems. Public and private telephones, intercom, radio and TV (campus closed circuit), computer circuiting, clock and program, fire alarm, security and signal systems.

I. Utility Services. Adequacy and efficiency (quantitative and qualitative) of supporting utility systems in the handling of existing building loads. Capacity in relation to current use of all utilities supplied from a central system or waste distribution to bulk disposal facilities including water supply, sanitary and storm sewers, heating or chilling mains, gas, air and the supply of electrical energy.

2. Building Services. A prorata evaluation of labor and materials expended in routine maintenance of a facility.

A. Construction Materials. Floors, ceilings, exterior, and interior walls, roofing, sheet metal and special finishes.

B. Mechanical Systems. Heating, ventilating, air conditioning and elevators.

C. Electrical Systems. Fixtures, wiring, controls, and communications gear.

3. Codes and Safety. A general appraisal of the building plan and individual building features contributing to or detracting from the *safety* and *protection* of the occupants and general public. Identifiable deviations from the State Building Code to be reported for immediate corrective action by the user agency: stairs, access and egress; fire prevention and smoke detection; protection of hazardous laboratory materials, industrial gases and volatile liquids.

4. Building Location. A statement of the compatibility of building location as measured against the following criteria:

   A. Relationship to Existing Campus Development. Architectural considerations of siting, massing and design as related to topographical features, function, pedestrian and vehicular traffic patterns and proximity to functionally related structures and major utility distribution points.

   B. Relationship to Campus Master Plan and Community. As above, but including physical relationships to community for community participation oriented facilities; access and parking.

   C. Historical Significance. Institutional tradition, historic community identity or both.

5. Land Use. The evaluation of a structure in terms of *optimum use of the land in context with*:

   A. Existing Use. Population, building valuation, building density on site, space disposition (hi rise, walk up), water tables, subsoil, conditions, topographical limitations.

   B. Future Use. Projection of items under A (above) against campus master plan.

Obsolescence Formula Study Factors -
Point System, Technical and Operational

	Maximum Points	Points Assigned Ordinary	Extra*
1. Physical Characteristics	52		
A. Structural Condition		4	
B. Exterior Condition		4	
C. Interior Condition		4	
D. Building Efficiency		6	
E. Adaptability to Expansion		6	
F. Mechanical Building Systems		10	
G. Electrical Building Systems		10	
H. Special Systems		4	
I. Utility Services		4	
2. Building Services	7		
A. Construction Materials		3	
B. Mechanical Systems		2	
C. Electrical Systems		2	
3. Codes and Safety	10	10	
4. Building Location	15		
A. Relationship to Existing Campus Development		6	
B. Relationship to Campus Master Plan and Community		6	
C. Historical Significance		3	
5. Land Use	16		
A. Existing Use		8	
B. Future Use		8	
		100	

*Extraordinary points are intended for the identification of physical or operational limitations of such gravity as to have a disproportionate effect on present and future space use of the facility. It is further intended that they be considered and applied only in the context of an emergency measure necessary to project an accurate assessment of space depreciation.

Points may be assessed at a rate not to exceed 10 per category (5 categories) and may be cumulative biennially.

Obsolescence Formula Study
Hartford School - Point System, Technical and Operational

	Maximum Points	Assigned Points Ordinary	Extra
1. Physical Characteristics			
A. Structural Condition	4	3	
B. Exterior Condition	4	3	
C. Interior Condition	4	2	
D. Building Efficiency	6	5	
E. Adaptability to Expansion	6	0	5
F. Mechanical Building Systems	10	5	
G. Electrical Building Systems	10	7	
H. Special Systems	4	3	
I. Utility Services	4	3	
2. Building Services			
A. Construction Materials	3	1	
B. Mechanical Systems	2	1	
C. Electrical Systems	2	1	
3. Codes and Safety	10	8	
4. Building Location			
A. Relationship to Existing Campus Development	6	3	
B. Relationship to Campus Master Plan and Community	6	0	5
C. Historical Significance	3	0	
5. Land Use			
A. Existing Use	8	4	
B. Future Use	8	0	5
	100	49	15
		15	
Total Assigned Points		34	

Obsolescence Formula Study Factors - Description

Academic

It is intended that the criteria as listed in this category be subjected to an academic evaluation encompassing educational adequacy, efficiency and use of space, building (fixed) equipment, environment, climate, support services, utility availability and distribution; such evaluation to be based on current academic use and conducted on a room-by-room basis.

1. Space Requirements

   A. Area Provided for Each Unit of Use
   B. Area Provided for Ancillary Equipment
   C. Surge Capacity
   D. Area Restrictions and Limitations
   E. Storage

2. Space Efficiency

   A. Control Requirements
   B. Exit and Entrance Conditions
   C. Traffic Patterns in Room
   D. Effect of Adjacent Occupancies
   E. Security
   F. Academic Load

3. Flexibility of Space

   A. Adaptability to Temporary Change
   B. Adaptability to Permanent Change
   C. Modernization Capability
   D. Improvement of Quality Levels
   E. Multiple Use

4. Location

   A. External Traffic Disturbance
   B. Internal Traffic Patterns
   C. Relation to User
   D. Relation to Staff
   E. Relation to Other Units
   F. Required Interaction
   G. Public Usage

5. Environment

   A. Special (Heat, Cold, Humidity, Static Free, Sterile)
   B. Light
   C. Heat
   D. Ventilation
   E. Air Conditioning
   F. Acoustics
   G. Aesthetics
   H. Psychological Factors

6. Fixed and Movable Equipment and Accessories

   A. Adequacy
   B. Suitability
   C. Location
   D. Condition

7. Support Services

   A. Electrical Energy
   B. Communications
   C. Water, Air, Gas and Vacuum Supplies
   D. Solid, Liquid and Gaseous Waste Disposal

Obsolescence Forumla Study Factors - Academic Evaluation Point System Value Range Table

A general statement compiled by the user agency, establishing the parameter of factors affecting space utilization.

	Points		
	Minimum	Maximum	
Space Requirements	5	40	Point range derived
Space Efficiency	5	20	from stated factors
Flexibility of Space	5	30	is intended to be
Location	5	15	illustrative and not
Environment	5	20	limiting.
Fixed and Movable Equipment	5	20	
Support Services	5	30	

Assignment of Points from Established Value Range Table and Room Evaluation

A statement of values derived from the value range table and applied to the specifics of a given area and academic function (classrooms, labs, offices).

	Weighted Points	Assigned Points
Space Requirements	25	
Space Efficiency	10	
Flexibility of Space	15	
Location	15	
Environment	15	
Fixed and Movable Equipment	5	
Support Services	15	
Maximum Permissible	100	

Coefficient of Utilization (c)

The total of the assigned points (by definition less than 100) represents an academic coefficient of utilization for individual areas.

Area Utilization

C X Room Area = Utilization Factor (u) in sq. ft.

Building Utilization

Obtained by totalling utilization factors of academic and support areas for the facility.

Academic Efficiency

$$\frac{\text{Building Utilization (sq. ft.)}}{\text{Assignable Academic Space (sq. ft.)}} = \%\ \text{Efficiency Ratio.}$$

Obsolescence Formula Study Factors - Academic Evaluation Point System - Building "X"

FACTORS	POINT RANGE MIN.	MAX.	STAFF OFFICES WP	AP	GRAD OFFICES WP	AP	STORAGE WP	AP	SEMINAR WP	AP	LAB (L) WP	AP	LAB (R) WP	AP
1	5	40	25	25	30	10	35	10	30	20	15	10	35	30
2	5	20	15	12	10	5	20	15	15	15	15	5	5	5
3	5	30	10	5	20	10	10	5	10	5	5	5	5	5
4	5	15	15	15	10	5	10	5	10	5	5	0	10	10
5	5	20	10	5	10	5	5	0	20	15	20	10	10	5
6	5	20	15	5	10	4	15	15	10	5	20	5	5	5
7	5	30	10	8	10	6	5	5	5	5	20	10	30	25
TOTAL W.P.			100		100		100		100		100		100	
COEFF. (C) OF UTILIZATION				75		45		55		70		45		85

Assignable Square Footage

Laboratories (R)	1836
Laboratories (L)	1404
Storage	537
Staff Offices	660
Grad Offices	930
Seminar	228
	5595

Gross Square Footage

9020

Area Utilization (U) Sq. Ft.

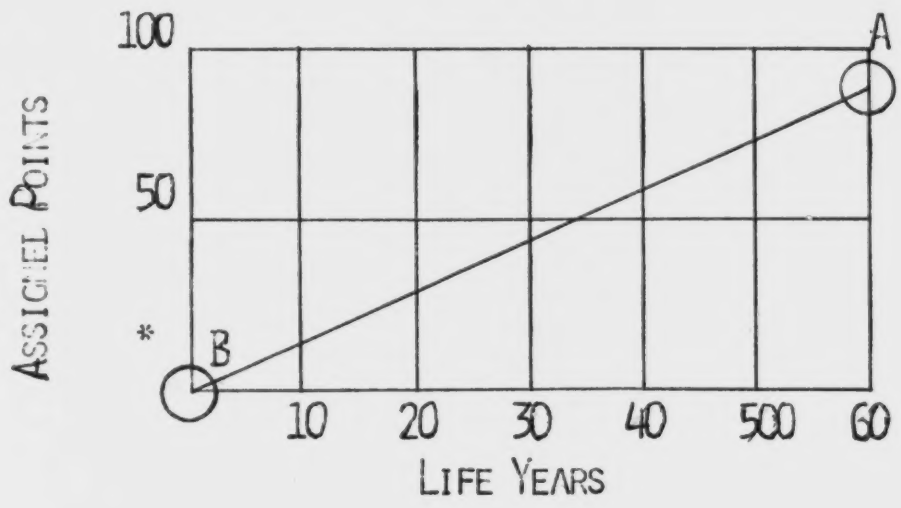
Laboratories (R)	1836 x 85	1560
Laboratories (L)	1404 x 45	632
Storage	537 x 55	295
Staff Offices	660 x 75	495
Grad Offices	930 x 45	418
Seminar	228 x 70	160
	Building Utilization	3560 Sq. Ft.

Academic Efficiency

$$\frac{\text{Building Utilization}}{\text{Assignable Academic Space}} = \frac{3650}{5595} = 65.2\%$$

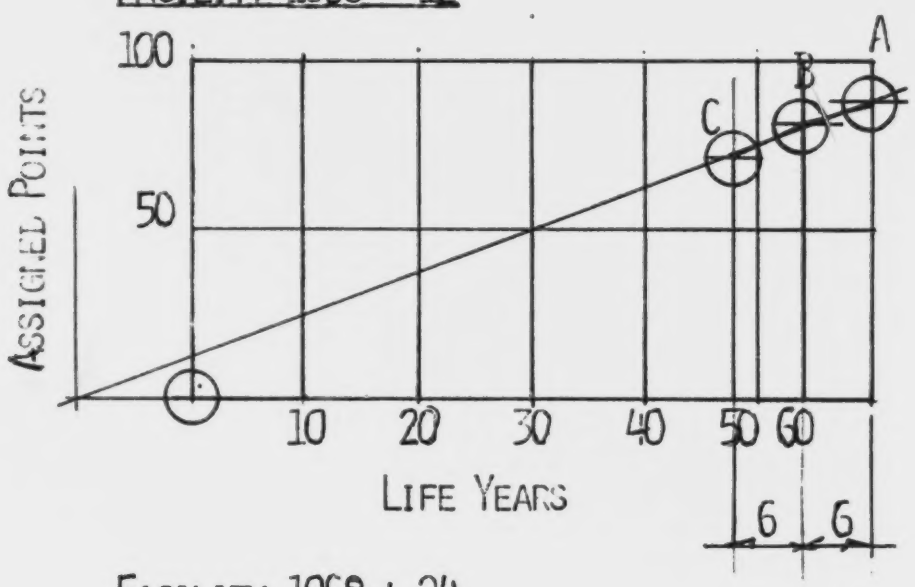
Obsolescence Formula Study - Point System Time Relationship
Rate of Obsolescence - Projection in Graphic Form

FACILITY (NEW) 1968



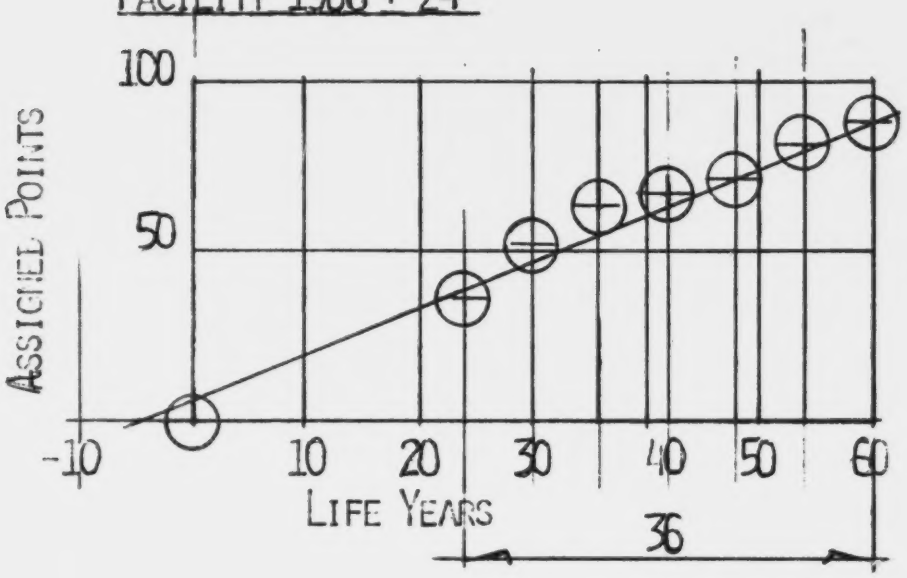
- Rate of obsolescence a measure of slope of the line.
- A and B both established as a result of an initial (design) evaluation.
- Predicted (design) life 60 years.

FACILITY 1968 + 12



- Elapsed time of 12 years representing completion of second 6 year inspection.
- A, B and C established as a result of independent evaluation.
- Predicted life 70 years.

FACILITY 1968 + 24

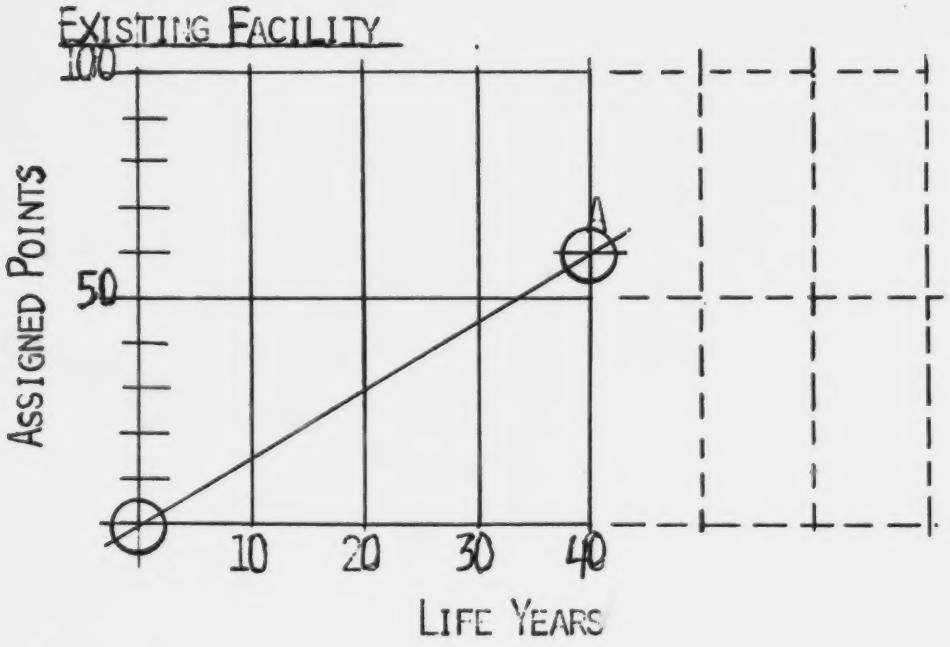


- Cumulative data acquired from four consecutive 6 year inspections.
- Predicted life 65 years with anticipated accuracy of one biennium.

*Graph "0" Minimum acceptable point count under which building can properly function for a given mission.

Obsolescence Formula Study - Point System - Time Relationship
Downer Evaluation - Like Function and Construction

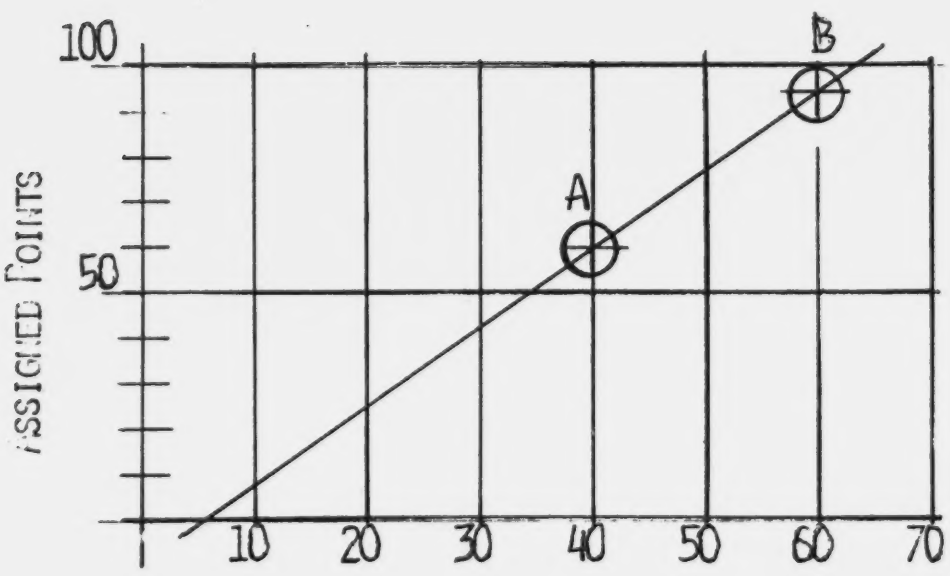
	1965 Recommendations	Built	Total Life Expectancy (Years)
McLaren Hall	3	1903	65
Engelmann Hall	25	1926	64
Sabin Hall	25+	1927	63
Kimberly Hall	5	1908	60
Albert Hall	5	1907	63



First Method

Predicted slope, current valuation "A" and building life of 40 years based on initial inspection.

(Similar to Downer study.)

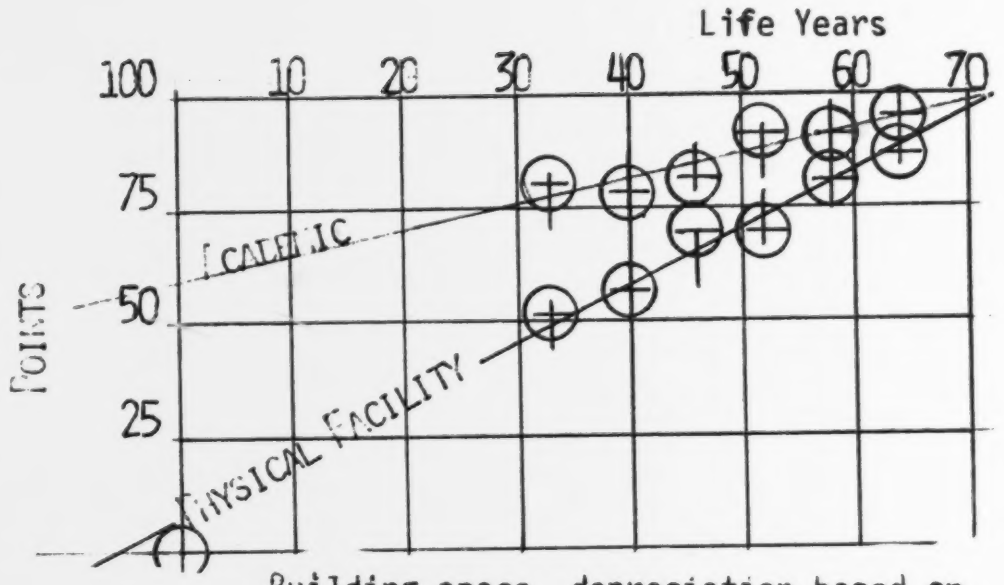


Second Method

Predicted slope based on two initial evaluations.
A. Current "A"
B. Retroactive based on new structure "B"

Obsolescence Formula Study
Point System - Time Relationship

Classroom Building

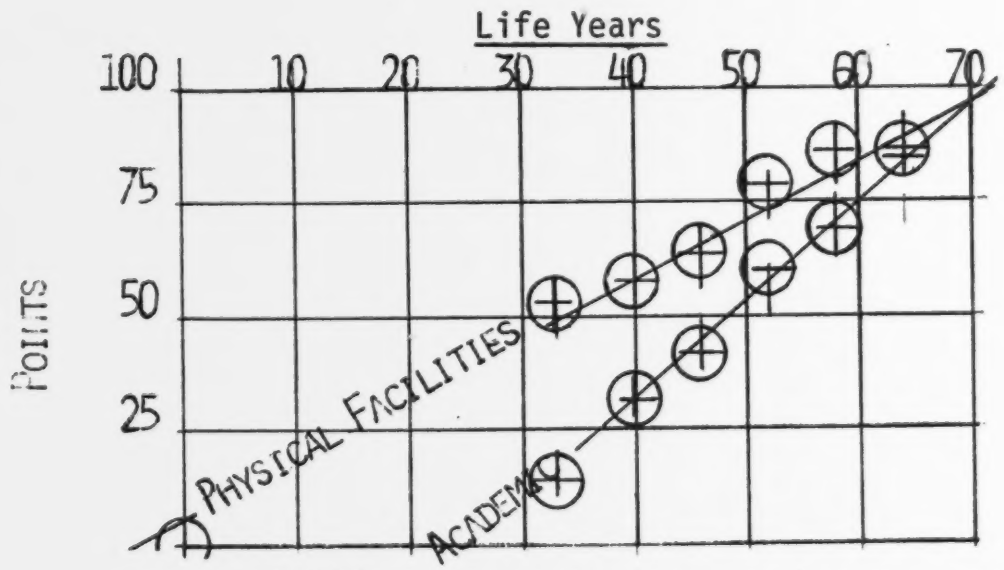


Built 1930
Estimated Life:
1. Academic
   Indefinite
2. Physical Facility
   A. Initial
      Estimate
      70 years
   B. Actual
      Projection
      78 years

Building space depreciation based on physical deterioration occurring over 78 year span

Limiting Factor - Physical Facilities

LIBRARY



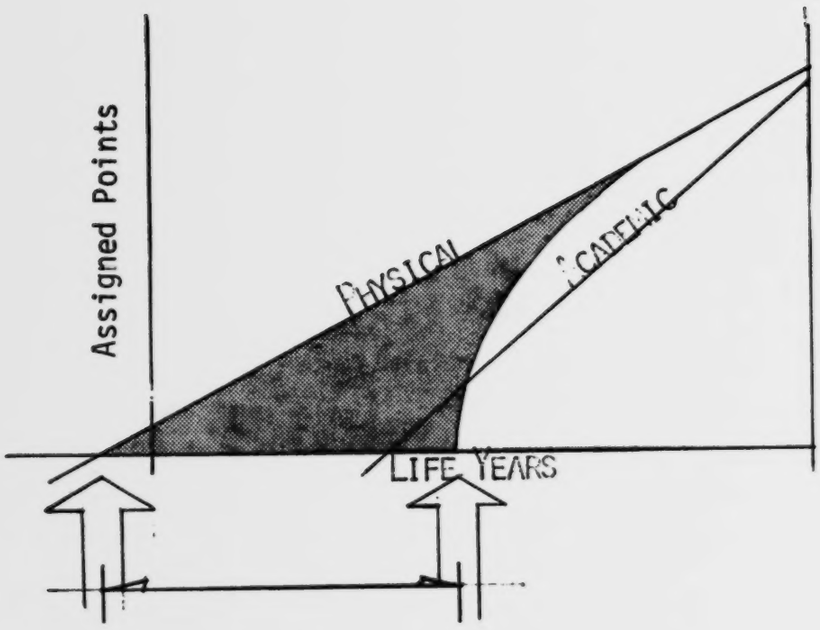
Building space obsolescence based on academic usefulness which depreciates fully in 45 years.

Projected physical life 75 years: assignable square footage available for re-evaluation in terms of new academic function.

Limiting Factor - Academic Mission

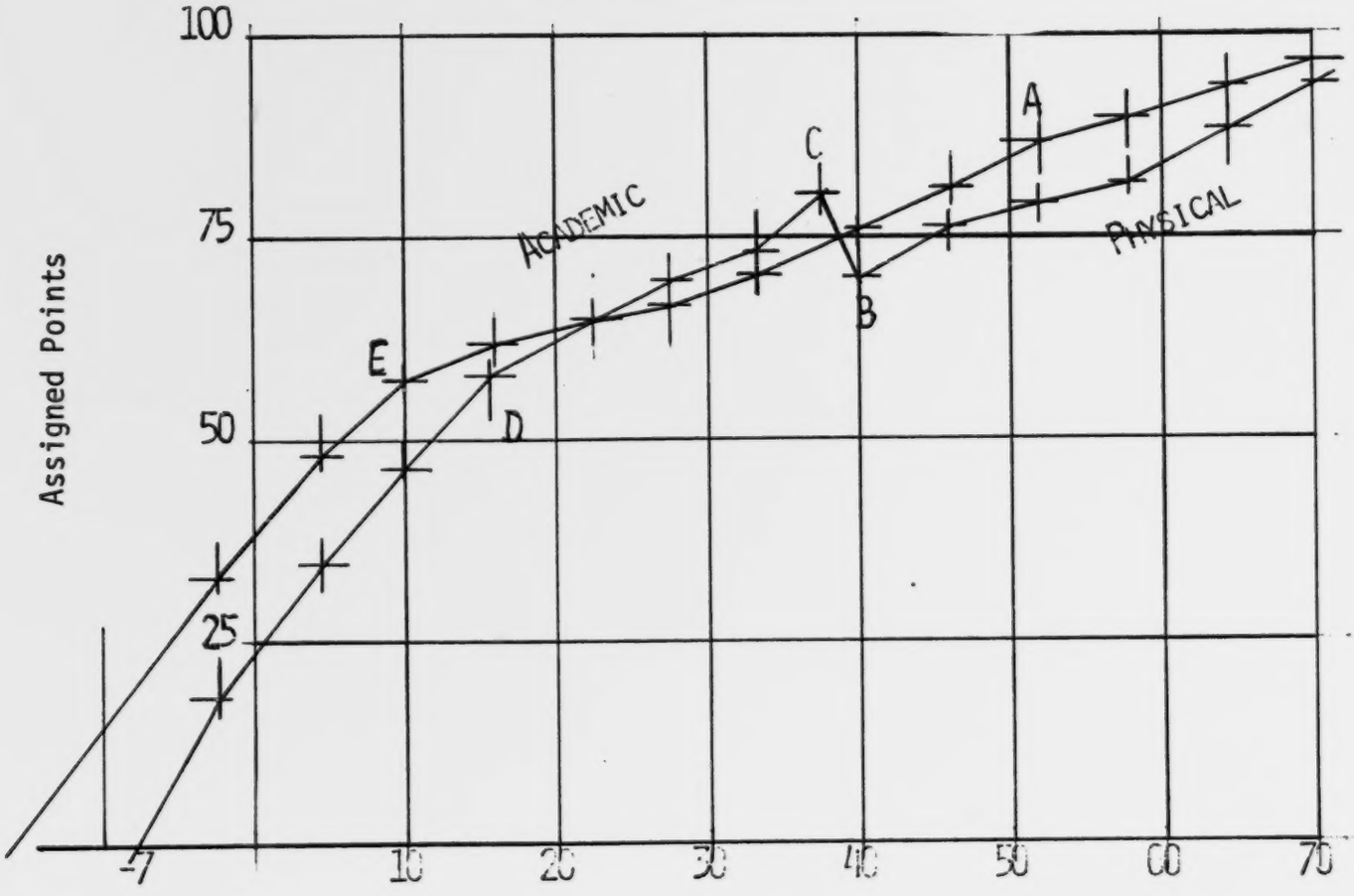
Obsolescence Formula Study
Point System - Time Relationship

Library



Cumulative effect of application of extra points to physical facility graph.

Typical Graph



McLaren Hall	
Built	1903
Additions or Modifications	None
Space	19,456 sq. ft. including basement 10,080 sq. ft. assignable

GENERAL: This building was the third dormitory to be built on the Downer Campus and was occupied by 60 students in September 1903.

Assignable space is entirely occupied by dormitory rooms and support facilities such as an administrative office, lounges, basement recreation area and laundry. There is no food service capability.

REPORTS:

Date	Physical & Operational	Academic
1909		
1915		
1921		
1927		
1933		
1939		
1945		
1951		
1957		
1963		